NASA Conference Publication 10193

Physics & Process Modeling (PPM) and Other Propulsion R&T

Volume I: Materials Processing, Characterization, and Modeling; Lifing Models

Proceedings of the PPM and Other Propulsion R&T Conference
held at the Cleveland Airport Marriott
sponsored by NASA Lewis Research Center
Cleveland, Ohio
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National Aeronautics and
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FOREWORD

The Propulsion Systems Program is one of six Propulsion Systems Research and Technology Base Programs within the NASA Aeronautics Enterprise. This program, which consists of a number of projects that are structured to address the critical technology needs of a range of vehicle classes, focuses on the goals of safety, environment, capacity, efficiency, affordability, performance, and survivability.

The Propulsion Systems Program relies on a number of critical technical competencies to perform research and develop technologies. Among these competencies are propulsion materials and structures. On May 1, 1997, individuals involved in materials and structures research under several of the Propulsion Systems Program projects met at the Cleveland Airport Marriott, in Cleveland, Ohio, to discuss their progress at the PPM and Other Propulsion R&T Conference. Representatives of government, industry, and universities heard presentations on material processing, material characterization, modeling, lifing, applied life models, design, vibration control, mechanical components, and tribology. This publication contains figures and supporting text from those presentations.

The majority of the research discussed was performed under the Physics & Process Modeling (PPM) project, which is focused on using physics-based models and process modeling techniques to reduce time, cost, and risk barriers to revolutionizing turbine engines and power systems. Other Propulsion Systems Program projects represented in the conference were Smart, Green Engine (SGE); Fast, Quiet Engine (FQE); High Temperature Engine Materials Program (HITEMP); and Hybrid Hyperspeed Propulsion (HHP). Also represented were the Rotorcraft Systems Program and the NASA Lewis Director's Discretionary Fund.

This conference was held in conjunction with three other conferences at the NASA Lewis Materials and Structures Technology Symposium. The other conferences addressed Advanced Subsonic Technology, Enabling Propulsion Materials, and the High Temperature Engine Materials and Structures Project.

Conference Chairs:

Douglas A. Rohn
L. James Kiraly

PROGRAMS AND PROJECTS

Papers contained herein support the goals of the following projects:

Program or Project	Paper Numbers
Propulsion Systems Program	
Physics and Process Modeling (PPM) project	3, 4, 8, 10, 11, 12, 15, 16, 17, 19, 20, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36
Smart Green Engine (SGE) project	28, 29
Fast, Quiet Engine (FQE) project	1, 6
High Temperature Engine Materials Program (HITEMP)	14, 18
Hybrid Hyperspeed Propulsion (HHP) project	2, 7, 9, 13
Rotorcraft Systems Program	22, 23, 37
Lewis Director's Discretionary Fund	5